Management System Description: Work Planning and Control

Dates: Effective **Oct 2, 2007** (Reviewed **Oct 2, 2007**) , Periodic Review Due: **Oct 2, 2012**
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1.0 Purpose

The purpose of this management system is to establish requirements at Brookhaven National Laboratory so that all work is properly managed by using a level of planning commensurate to the Environment, Safety, Security and Health (ESS&H) hazards, job complexities, and work coordination needs. The management system establishes work control processes based on the Integrated Safety Management Core Functions of: defining the scope of work, identifying the hazards, developing controls, performing work within the controls, and providing feedback for continuous improvement. For this management system, "work" is defined as the activities that involve the design, set-up, operation, maintenance, modification, construction, demolition, or decommissioning of facilities, systems, or experiments by BNL or non-BNL staff (contractors, visiting scientists, students, and minors).

2.0 Responsibilities

Deputy Director for Operations

The Deputy Director for Operations is responsible for

- Establishing the Laboratory-level requirements for planning of work and associated risk and hazard controls
- Signing the FUA Change Analysis Document for major changes to the FUA (i.e., changes to the Operational Safety Envelope of the Facility), before the start of the experiment.

Deputy Director for Science and Technology

The Deputy Director for Science and Technology is responsible for establishing Laboratory-level requirements for design, hazard/risk identification, work planning and control, review, and operation of experiments.

Assistant Laboratory Director of Facilities and Operations

The Assistant Laboratory Director of Facilities and Operations is responsible for establishing Laboratory-level requirements for planning and associated risk and hazards controls associated with capital and expense projects: maintenance, modification, and repair work.

Associate / Assistant Laboratory Directors

Associate/Assistant Laboratory Directors are responsible for consistently and completely implementing the requirements of this Management System, as appropriate.

Contract Technical Representative

The Contract Technical Representative is responsible for reviewing contractor or supplier Health and Safety Plans.

Department Chairs/Division Managers

Department Chairs/Division Managers are responsible for

- Appointing Work Control Managers, Work Control Coordinators, and Experiment Review Coordinators
- Appointing members to serve on the Experimental Safety Review Committee
- Reviewing and approving facility experiments
- Routinely monitoring experiments and operations to ensure that they are being operated/conducted as approved
- Ensuring that Department/Division employees are trained to the level required to perform the tasks that they are assigned.

Department Experiment Review Coordinator

The Department Experiment Review Coordinator, appointed by the Department Chair/Division Manager, is responsible for

- Assisting the Principal Investigators/Responsible Persons (PIs/RPs) in generating Experimental Safety Reviews
- Serving as the interface between operational groups and the experimenters as well as the Experimental Safety Review Committee (ESRC) and the experimenters
- Representing their Department/Division in experimental-related activities and meetings
- Notifying other Departments/Divisions about hazards associated with an experiment (or significant modification to an experiment)
- Determining if planned experimental activities impact the hazard classification, programmatic/quality issues, or safety/environmental envelope of the facility
- Maintaining the Experimental Safety Review documentation and any ESRC documentation or minutes
- Documenting annual reviews and reviews of modifications.

Experimental Safety Review Committee

The Experimental Safety Review Committee is responsible for reviewing experiments (and significant modifications to experiments) for the following:

- Environment, Safety, Security and Health (ESS&H) concerns
- Appropriate controls for each experiment (during set-up, operations, and tear-down) are

established

- Department/Division approval or disapproval of the installation and/or operation of the experiment
- Operational Safety Limits or Accelerator Safety Envelope established by any pertinent Safety Analysis Report or Safety Assessment Document/Accelerator Safety Envelope Document, as appropriate
- Laboratory-level review committee involvement, if appropriate.
- Documented approval of experiments.

Principal Investigator/Responsible Person (PI/RP)

The Principal Investigator/Responsible Person (PI/RP) is responsible for

- Developing the Experimental Safety Review, i.e., safety analysis, identify and mitigate hazards, establishing controls and limits, develop procedures as appropriate, and establish the chain of command for the conduct of experimental operations
- Operating the experiment within the terms, controls/limits, and conditions established by the Experimental Safety Review Committee and approved by the Department Chair/Division Manager.

Safety Engineer

The Safety Engineer is responsible for

- Determining contractor and supplier health and safety plan requirements
- Reviewing and approving contractor or supplier Health and Safety Plans.

Supervisor

The Supervisor is responsible for

- Ensuring work is conducted according to approved plans and permits
- Evaluating staff concerns in regards to planning and performing work
- Conducting a pre-job briefing with the work crew to review job hazards, permits, and/or work coordination requirements
- Verifying that training/qualification requirements are met prior to re-authorizing work to proceed
- Authorizing work to proceed
- Ensuring the work site is left in a clean and safe condition
- Obtaining feedback from workers, and providing feedback to appropriate personnel.

Work Planning and Control Point of Contact

The Work Planning and Control Point of Contact is responsible for

- Maintaining this Management System Description, and ensuring the Work Planning and

Control for Experiments and Operations Subject Area is up-to-date

- Taking actions and making changes that will improve the Work Planning processes at the Laboratory
- Determining how well the Work Planning and Control processes are being implemented throughout the Laboratory. This can be done by
  - Determining how each Department/Division assesses their own Work Planning and Control Processes
  - Soliciting and receiving feedback from the Work Control Managers and Experiment Review Coordinators
- Organizing, participating, and facilitating Work Control Manager/Experiment Review Coordinator meetings
- Keeping the Management System Steward apprised of the status and health of the Laboratory's Work Planning and Control Processes
- Providing Lessons Learned feedback to the Departments/Divisions.

Work Control Manager

See the Work Control Manager R2A2 Profile Title in the Roles, Responsibilities, Accountabilities, and Authorities (R2A2) Subject Area.

Work Control Coordinator

See the Work Control Coordinator R2A2 Profile Title in the Roles, Responsibilities, Accountabilities, and Authorities (R2A2) Subject Area.

3.0 Management System Operation

3.1 Overview

The Work Planning and Control Management System Description provides the following practices for properly managing work at the Laboratory. This work can vary from routine to complex and encompasses both operational and experimental activities. These work practices are

- Experimental Safety Review (see the section Experimental Safety Review in the Work Planning and Control for Experiments and Operations Subject Area)
- Work Planning and Control for Operations (see the section Work Planning and Control for Operations in the Work Planning and Control for Experiments and Operations Subject Area)
- Standard operating procedures (as defined in the Internal Controlled Documents Subject Area)

3.2 Key Functions/Services and Processes

The key elements and processes that must operate for Work Planning and Control to function properly are described in the following sections.

3.2.1 Key Processes

The Work Planning and Control Management System establishes the standards to effectively plan and coordinate the work to meet the customers' needs, analyze the ESS&H hazards, and efficiently

complete the job. This system uses input from various Management Systems to support the practices for identifying and analyzing ESS&H hazards and Quality concerns.

The practices that are maintained by the Work Planning and Control Management System Description for controlling the various work functions are the following:

1. Experimental Safety Review (see the section Experimental Safety Review in the Work Planning and Control for Experiments and Operations Subject Area) - All organizations conducting experiments use this process to identify the hazards, plan the work as well as the controls, and authorize the experiment. The practice provides a graded approach to determine the level of planning rigor needed in the documentation. Each Department/Division uses an Experiment Review Coordinator to determine if a proposed or modified experiment requires a new Experiment Safety Review Committee review, or if it fits within established controls from previous reviews.

2. Work Planning and Control for Operations (see the section Work Planning and Control for Operations in the Work Planning and Control for Experiments and Operations Subject Area) - This practice applies to all physical work performed by BNL and non-BNL staff, and also uses a graded approach to identify hazards, risks, and complexity levels, and to establish the level of rigor for planning and review. The practice has three modes of work planning (1) Worker Planned, (2) Prescribed, and (3) Permit Planned. “Worker Planned” work concept recognizes the skill levels and technical capabilities of the crafts, technicians, and scientists to recognize hazards and implement controls for low risk work. The “prescribed work” practice relies on instructional work documents (e.g. written and approved internal procedures, contractor health and safety plan, contractor procedure, and vendor operating or maintenance manual.) The level of detail in prescribed work documents must be such that the individual who is assigned to carry out the action can understand both the reasons for the action, and each step, task, action or behavior to safely and effectively implement the action. “Permit Planned” work practice requires use of a site-wide Work Permit Form for all moderate- and high-hazard work that is not covered by prescribed work documents.

The graded approach to using the above work practices is shown in Table 1. As the hazard and complexity level increases, the planning rigor, documentation, and level of control also increases.

Table 1. Graded Approach to Work Planning and Control

Level of ESS&H Risk, Complexity, and Coordination	Level of Work Planning and Control
Low	Worker Planned Work* that includes pre-job brief by self-checking the hazards and controls at the work site and feedback to supervision after the job is complete and the area is left in a clean and safe condition.
Moderate	1) Written and approved internal procedures or other prescribed work documents with step-by-step instructions and sign-offs 2) Experimental Safety Review approved by the Department/Division

	3) Work Permit ** **NOTE:** Can be a combination of up to all or just one of the above.
High	1) Written and approved internal procedures or other prescribed work documents with step-by-step instructions and sign-offs 2) Experimental Safety Reviews approved by the Department/Division (or higher approval level as recommended by the ESRC) 3) Work Permit with Job Safety Analysis (JSA) **NOTE:** Can be a combination of up to all or just one of the above

* Work Permit may still be used.
** JSA is recommended.

3.2.2 Key Elements

The key elements underpinning the Work Planning and Control System processes are as follows (see Figure 1):

(1) Criteria for Preparation of Scope of Work

- Description of customer requirements, specifications, and constraints must be well defined
- Work or experiment must fit within the safety envelope of the facility in which the activity will be performed
- Work or experimental scopes are defined in a manner that ensures all business aspects are given proper consideration
- Work description requirements must be tailored to the hazards and complexity of the work
- Work is defined at a level such that workers, supervisors, planners, and appropriate ESS&H personnel can readily identify the hazards and risks
- Environmental elements are considered during work definition and planning
- Planning processes should provide for early involvement of workers and ESS&H personnel.

(2) Criteria for Hazard Analysis

- Tailored pre-job and pre-experiment reviews required
- Worker involvement emphasized
- Facility/Job Risk Assessments (FRA/JRA) are used to assist in hazard identification
- Established tools are used in planning projects, experiments, maintenance and modification work, and in writing standard operating procedures
- Planners, workers, ESS&H staff, and facility management walk down work sites, as

appropriate, to identify hazards.

(3) Criteria for Hazard Control

- Hazard controls are tailored to the work being performed
- Controls are applied in the proper sequence (engineering, administrative, and personal protection equipment)
- Hazard controls are comprehensive enough for proper hazard mitigation and flexible enough for maintaining adequate planning and implementing efficiency
- Authorization basis and facility safety requirements are translated into specific information that is usable by workers within the facility (SOPs, Facility Use Agreements [FUAs])
- Work documents will be completed as appropriately with adequate procedures and instructions
- Workers and appropriate safety professionals will be included on planning teams and involved in hazard control development
- Consistent procedures for hazard control are in place across the site
- Training requirements (if any) for jobs are established
- Pre-job briefings are required for all jobs categorized as moderate and high hazard
- Job Safety Analyses are required for work rated as high hazard.

(4) Criteria for Work Within Controls

- Applicable "Conduct of Operations" practices are used
- Employees are empowered with "Stop Work Authority"
- When new or additional hazards are identified, put a temporary hold on the work and consult with appropriate personnel
- Work Control Managers/Work Control Coordinators and supervisors ensure work is performed within approved plans and permits
- Experiment Review Coordinators and Principal Investigators/Responsible Persons are required to operate experiments within approved Experimental Safety Reviews
- Mechanisms are in place to address changes in work scope and identification of new hazards
- Appropriate Self-assessments and Management Steward Assessments are used to ensure that work is performed to plan.

(5) Criteria for Feedback and Improvement

- Lessons learned are used to improve the processes
- Procedures and/or mechanisms are in place to examine the findings of assessments in regards to tracking, trending, and corrective actions
- Post-job critiques are used as appropriate to evaluate the safety and effectiveness of work execution
- Self-assessment and Management System Assessment programs have been established
- Ongoing meetings take place throughout the Laboratory to communicate lessons learned,

performance review, and corrective action assignments (WCM/ERC meetings, tailgate meetings, toolbox meetings, shift turnover meetings, QA closeout/exit meetings, assessment review meetings, periodic safety meetings, etc.)

- Operational logbooks are established throughout many Departments/Divisions in the Laboratory
- Communications processes, such as safety concerns programs, safety meetings, and Tier 1 inspections provide avenues for feedback and improvement ideas from workers.

3.2.3 Management System Assessments

This Management System will be assessed in accordance with the section Planning and Conducting Management System Self-Assessment Programs in the Integrated Assessment Subject Area.

3.3 Critical Support Mechanisms

The Work Planning and Control System uses the following critical support mechanisms to function efficiently and effectively:

- Integrated Assessment Program, including self-assessment and independent oversight, provides feedback on effectiveness of various systems and is used to identify improvements
- Lessons Learned System provides feedback for changing planning procedures or checklists to minimize recurrence of the incidents
- Building Manager Program provides a single-point-of-contact for issues and needs of facility-related work planning and control
- The Training and Qualification Management System provides for line management to ensure that identified training needs are meet before work is performed
- The Facility Use Agreement (FUA) Program works as the system to maintain an authorization basis for the buildings.

4.0 Outputs

In addition to the system-wide Generic Outputs, the following table describes the products provided by this Management System to its primary customers. It also lists the other management systems that use this output.

Outputs	Primary Customer Using this Output	Management System Using this Output
Work Planning Documents	Project Managers, Work Control Managers, Work Control Coordinators, Line Supervisors, Experiment Review Coordinators, Laboratory Workers, Facility Support and Safety & Health Service Representatives	Facility Operations, Environmental Restoration, Environmental Management System, Real Property Asset Management, Science and Technology Program, Radiological Control
Risks & Hazards Identification Tools	Building Managers, Line Managers, Principal Investigators/Responsible Persons, Project Managers,	Facility Operations, Environmental Restoration, Real Property Asset Management, Environmental Management System, Worker Safety and Health, Science and Technical User Facility Operations

	Work Control Coordinators, Work Control Managers, Experiment Review Coordinators, ES&H Coordinators	and Maintenance, Radiological Control, Facility Operations
Identified Hazards	Line Managers, Work Control Coordinators, ES&H Coordinators, Principal Investigators	Environmental Management System, Worker Safety and Health, Facility Safety, Facility Operations, Science and Technical User Facility Operations and Maintenance, Occupational Medicine, Radiological Control
Experimental Safety Reviews	Experiment Review Coordinators, Principal Investigators/Responsible Persons	Facility Operations, Science and Technology Program
Guidance on the Use of Controlled Substances in Research	Experiment Review Coordinators, Principal Investigators/Responsible Persons	Facility Operations, Science and Technology Program

5.0 Inputs

In addition to the system-wide Generic Inputs, the following table describes inputs provided by this Management System's primary customers and support suppliers.

Inputs	Primary Originator Producing this Input	Management System Providing this Input
Technical Support Services in Hazard Identification, Analysis and Mitigation; Technical Support in General Work Planning	Subject Matter Experts from Safety & Health Services Division, Radiological Control Division, Quality Management Office, Plant Engineering Division, Environmental Services Division, Emergency Services Division, OMC, etc.	Facility Safety, Environmental Management System, Quality Management, Worker Safety and Health, Radiological Control, Emergency Preparedness, Real Property Asset Management, Occupational Medicine
Review, Guidance, and Recommendations on Nuclear Safety Activities	Subject Matter Experts	Facility Safety

6.0 Requirements

The following table summarizes requirements that this management system is responsible for.

REQUIREMENTS WITH PRIMARY RESPONSIBILITY This Management System is used to demonstrate overall institutional responsibility for the requirements document (versus individual parts of the document). The Primary Management System is responsible for identifying other (parsed) management systems that help implement the requirement.	
Document	**Title**
BSA Contract No. DE-AC02-98CH10886 - Clause I.86 ROD	Integration of Environment, Safety and Health into Work Planning and Execution

M 450.4-1 ROD	Integrated Safety Management System Manual
REQUIREMENTS WITH PARSED RESPONSIBILITY This Management System is used to demonstrate responsibility and accountability for part of the requirements document (the parsed unit versus the entire document).	
Document	**Title**
10 CFR 830, Subpart A ROD	Energy, Nuclear Safety Management, Quality Assurance Requirements
21 CFR 1300-1309 ROD	Controlled Substances
29 CFR 1910 ROD	Labor/Occupational Safety and Health Standards
40 CFR 82 ROD	Protection of Environment /Protection of Stratospheric Ozone
6 NYCRR 200 - 234 ROD	New York State Department of Environmental Conservation/Prevention and Control of Air contamination and Air Pollution
M 413.3-1 ROD	Project Management for the Acquisition of Capital Assets
NYS Title 10, Section 80 ROD	Controlled Substances
O 151.1B ROD	CRD - Comprehensive Emergency Management
O 151.1C ROD	Comprehensive Emergency Management System
O 226.1A ROD	Implementation of Department of Energy Oversight Policy
O 414.1C ROD	Quality Assurance
O 420.2B ROD	CRD - Safety of Accelerator Facilities
O 450.1 Change 3 ROD	Environmental Protection Program
P 450.7 ROD	Environment, Safety and Health (ESH) Goals
P 456.1 ROD	Secretarial Policy Statement on Nanoscale Safety

7.0 Core Services/Purchased Services

Core Services

Core services include the following:

- Maintenance of the subject areas and other procedures for the Work Planning and Control System
- Maintenance of the checklists for liability and hazards identification and the work permit form
- Work Coordination, requirements analysis, and hazard identification and mitigation, related to the planning, designing and conducting of experiments
- Work coordination, requirements analysis, and hazard identification and mitigation related to the maintenance, modification, setup, demolition, decommissioning, construction, or operation of facilities, systems, and experiments.

Purchased Services

Purchased services include the following:

- ESS&H Subject Matter Experts for hazard identification and mitigation analysis
- ESS&H Technical Support Specialists for monitoring of Experimental and Operational activities
- Technical Support Services required for the proper planning and control of Experimental and Operational activities.

8.0 Standards of Performance

Standards maintained by this management system are the following:

- Managers shall ensure that scopes of work properly consider all elements of the Laboratory's operational priorities.
- Management systems, standards, implementing procedures, and guidelines shall be developed with appropriate input from staff enabling them to effectively work in compliance with applicable requirements.
- All staff and users shall ensure that they are trained and qualified to carry out their assigned responsibilities, and shall inform their supervisor if they are assigned to perform work for which they are not properly trained or qualified.
- Managers shall analyze work for hazards, authorize work to proceed, and ensure that work is performed within established controls.
- All staff and guests shall comply with applicable Laboratory policies, standards, and procedures, unless a formal variance is obtained.
- All staff and users shall identify, evaluate, and control hazards in order to ensure that work is conducted safely and in a manner that protects the environment and the public.
- Managers shall solicit feedback from customers to improve the quality and value of delivered scientific and technological research and analysis.
- All staff and users shall conduct work within the facility-specific operational boundaries specified in Facility Use Agreements.

9.0 Other Supporting Information

The following Legacy Documents are maintained by this management system:

- This Management System does not maintain any Legacy Documents

The following Subject Areas are maintained by this management system:

- Stop Work
- Work Planning and Control for Experiments and Operations

The following Program Descriptions are maintained by this management system:

- Integrated Safety Management System

9.1 References

DOE P 450.4, Safety Management System Policy

DOE M 450.4-1, Integrated Safety Management System Manual

Figure 1. Core Functions of Work Planning and Control